DEPARTMENT OF WATER RESOURCES

News

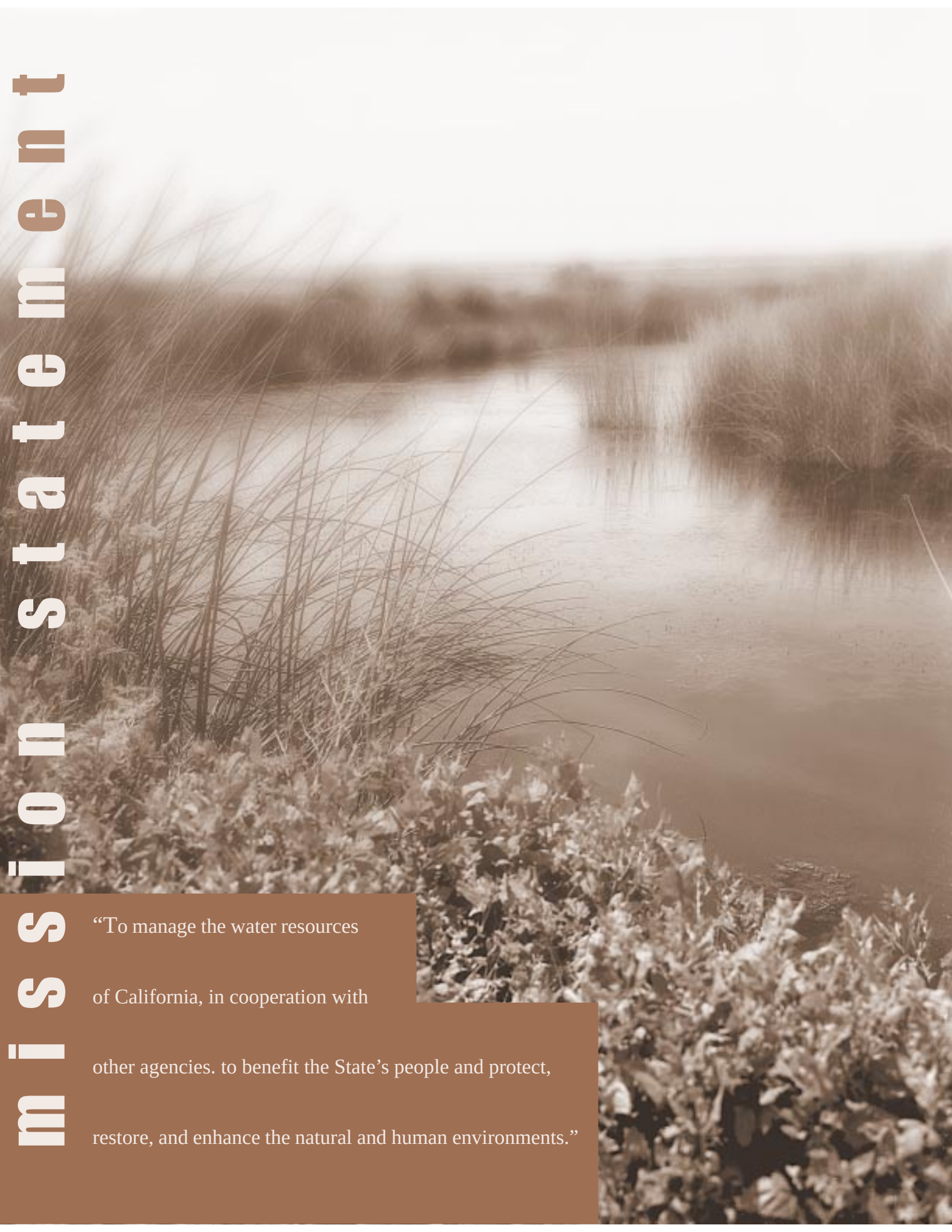
FALL ISSUE 1998

A Look Back

AT THE DEPARTMENT OF WATER RESOURCES

1983 - 1998

mission statement



"To manage the water resources of California, in cooperation with other agencies. to benefit the State's people and protect, restore, and enhance the natural and human environments."

FALL 1998

features

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WORD ABOUT THE INTERNET IS EVERYWHERE.

WWW addresses constantly flash on the TV screen during commercial breaks. Headlines say Net traffic is doubling every 100 days, with the online population numbering in the tens of millions. Nearly all big – and little – companies have home pages selling just about anything imaginable.

DWR ON THE NET

by **Joyce Tokita**

Web sites are big business – spawning a new industry and stretching the reaches of communications. Just a few decades ago, the network, which is now known as the Internet, served the nation's military and defense establishment. It linked government with research and development industries. Universities and research centers soon joined the network, and when it spread to the general public in the early 1990s, the Internet boomed.

It was about then that DWR ventured into cyberspace, primarily for research and data sharing with other agencies. From this early introduction came an increasing recognition of the Internet's potential as a new and more efficient way of conducting business. Today, DWR has more than two dozen web sites. The Department's main home page offers visitors information about DWR and links to its ever-growing list of public websites.

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THE EARLY PLAYERS

Back in 1989, DWR's former Division of Planning (now the Office of SWP Planning) gained access to the Net. "DWR was the first State agency on the Net," says George Barnes, Chief of SWPP's Modeling Support branch. His staff was among the early few in DWR to access databases from universities for computer modeling research.

The graphical interface now common to Internet users did not exist then. Data was text-based, but still offered the Department a new avenue of obtaining information from the water community. With Planning's early Internet entry, the door was opened for DWR's information analysts, or computer experts, in the Information Systems and Services Office to show just what was possible.

"Our web site went online in early 1994 to demonstrate to the Department the capabilities possible through the Net," adds Roger Linder, a system software specialist with ISSO. The office currently provides web hosting and other Net services for several DWR offices.

"We went online even before the big data centers like Teale," says Frank Farmer, also an ISSO system software specialist. "We created links to sites of interest to DWR employees, such as engineering and water law, as well as to water-related agencies. At that time, many employees were using a browser called Mosaic. It was an initial attempt to make employees aware of the Internet and its potential."

This coincided with the installation of DWR's wide area network, implemented by the Telecommunications Office and the Communications Branch under the Division of Operations and Maintenance. The WAN ties nearly all of the outlying offices with headquarters through a communications system that also allows remote operation of SWP facilities. Then followed the network's link to large capacity T-1 connections to the Internet and the World Wide Web.

"We contracted for the service with an Internet provider," explains Linder. "Each State agency pays for and is responsible for its own connections to the Net. We got online before most State agencies because the Department supports the use of state-of-the-art technology."

Another early participant to post a web site was the Cooperative Snow Surveys Program. Coordinated through DWR, the program provides a look at the State's potential water supply for the year through snowpack and water content measurements taken throughout the Sierras.

"The data we collect is time-sensitive. It is used by water project operators to schedule releases from reservoirs and to estimate deliveries to their contractors," explains Frank Gehrke who heads the DWR arm of the cooperative program which includes other State, federal, and local agencies.

"These agencies were often looking for specific data and didn't want to go through the computer to access the database because it was time-consuming and cumbersome. You had to have a password and user name. So they would call us and we'd have to interrupt our work to answer these phone inquiries.

"We also had the reports reproduced then mailed. The logistics of that process was made even more complicated by our move (away from reprographics and mail services at headquarters) to the Joint Operations Center."

It was Snow Surveys' involvement in another computer networking program called Sequoia 2000 that yielded an answer to the dilemma of providing other agencies with timely data.

Placing data online proved to be the perfect solution (along with other electronic means such as e-mail and fax). Data could be updated with ease, and agencies could obtain any piece of data at any time. The number of phone calls and mailings dropped dramatically, as did the turnaround time to disseminate the data.

Their web site went up in October 1994. Many of their data links are to CDEC, the California Data Exchange Center. Developed by DWR's Division of Flood Management, CDEC is used for forecasting floods and water supply conditions. Its comprehensive database includes precipitation amounts, weather forecasts, satellite weather maps, river stages and releases, runoff, road conditions, and more.

CDEC also began with limited computer access to its database, then went public in 1995. The response was overwhelming. So many queries came in during the floods that they sometimes interfered with staff's ability to quickly access much needed data. With additional servers and staff, CDEC is now prepared for future flood emergencies, as well as for the flood of calls during those events.

DWR's HOME PAGE

As individual web sites, such as Snow Surveys and CDEC, began to set up business on the Internet, it became evident to DWR executives and others that more offices would soon follow suit with their own web sites. It was also clear some form of structure would be needed. So a steering committee and technical sub-committee were formed to set standards, protocol, and review. The action was supported by Director Kennedy, who stated in an internal memo: "These...sites have proven to be a powerful medium in communicating with internal and external entities."

"These sites have proven to be a powerful medium in communicating with internal and external entities."

"The Director and Deputies have always been supportive of this means of data sharing and dissemination," says Larry Filby, an Information System Analyst with the Office of Water Education. Filby was instrumental in creating the Department's main home page. It premiered in January 1995, providing information about DWR's organization and responsibilities and serving as a gateway to other DWR sites, as well as those of related agencies. Since then DWR web sites have more than quadrupled.

"We have more web sites online than any other State department," says Filby. "DWR's decision to go online was a grassroots movement. Employees saw the opportunity and went on their own initiative. Existing staff developed the skills to put up their web sites."

As these web sites created interest in the Department and it became evident that there would be a proliferation of departmental web sites, management wanted to ensure that these would be developed in an orderly way.

"They wanted their creators to carefully construct their sites," Filby explains about the guidelines developed by the WWW Technical Committee in coordination with the Management Analysis Office and the Office of Water Education for review and approval. "The sites need to have interesting and useful content, be easily navigable and technically sound, and use graphics appropriately."

Once a site is approved by OWE and premieres on the Net, the fate and success of that site depend on its creators.

"There is no centralized webmaster, no monitoring of sites," Filby explains. "The Department doesn't require that all organizations develop a web site. Each division/office determines whether or not there is a need. The maintenance of that site is left to the division or office.

"I think that is our strength. Each web site is a living document that's always changeable. And often it is the users themselves who keep us on our toes by informing webmasters of links that malfunction or errors in the data or copy, as well as new features to include."

EACH **WEB SITE** IS A

LIVING DOCUMENT THAT'S ALWAYS **CHANGEABLE**

MORE TO COME

The array of data available through these DWR sites is quite impressive – ranging from computer modeling of hydrological conditions in the Delta to incidents and outages of State Water Project facilities, from water quality sampling taken at different Delta locations to dam safety guidelines and regulations, and from information on groundwater wells to videos and publications available to the public.

DWR is also working on intranet web sites, which encompass employee-only sites such as DWR Update (an online employee newsletter), Internet help, and a business system network. "We hope to place most of our administrative forms online and use the technology to reduce the amount of paper-work that is usually required," says Roger Linder. He and others at ISSO are quite proud of the fact that the Department is a leader in the technology.

"There are many more DWR sites in development," adds Larry Filby, "AND we've only just begun our work on the Internet."

A Guide To DWR WebSites

"DWR California Water Page,"

main DWR Home Page:
http://wwwdwr. water.ca.gov/
provides information for the public about the Department, its organization, contacts, news releases, publications, the State Water Project, and reservoir, river, surface and groundwater conditions.

Listing of links to other DWR web sites:

http://wwwdwr.water.ca.gov/dir-general_informationR2/DWR_Home_Pages_R2.html

Reports Administration
http://rubicon.water.ca.gov/
listing of available publications from DWR, also bulletins and reports online such as Bulletin 160-98 Public Review Draft, and the Sacramento-San Joaquin Delta Atlas, etc.

Interagency Ecological Program

(cooperative state-federal effort for Bay-Delta)
http://www.iep.ca.gov/
mission/goal, organization (member agencies/project teams), listing of IEP reports, contacts, available data, program and activities.

Office of State Water Project Planning

http://wwwdop.water.ca.gov/
brief description of SWPP responsibilities, links to other SWPP sites, search site function, and links to other DWR and water-related sites.

SWPP Program Sites

Delta Modeling Section
http://wwwdelmod.water.ca.gov/
DSM2 (a river, estuary, and land modeling system), CALFED studies, employee contacts, marginal export cost, trihalomethanes, neural networks, applications, documentation, links to other related sites.

Hydrology and Operations Section
http://wwwhydro.water.ca.gov/
overview, development and application of computer models such as DWRSIM (reservoir simulation model of CVP-SWP systems) and other projects in progress, data, related studies, employee contacts, CALFED spreadsheet model and documentation, and change lot of site contents.

Interim South Delta Program
http://sdelta.water.ca.gov/sdelta/web pg/isdp4.htm
project profile, map of components, studies, glossary.

Information Systems and Services Office

Year 2000 Information Center
http://wwwy2k.water.ca.gov/
problem description, DWR's plan, staff, summary charts, what's new, links.

Division of Flood Management

California Cooperative Snow Surveys
http://cdec.water.ca.gov/snow/
data on snowpack, precipitation, runoff, reservoirs, water supply, snow courses, collection, data retrieval tools, data files, contacts, summaries on history, snow surveyors, forecasts and how a survey is made (many of the above links are to CDEC web site below).

California Data Exchange Center
http://cdec.water.ca.gov/
data on tributaries to the Sacramento and San Joaquin rivers, plus other northern California rivers, reservoir releases and daily/monthly status of storage, tides, satellite images, precipitation, snowpack, etc. (This is the web site most accessed during flood events.)

Floodplain Management
http://www.fpm.water.ca.gov/
model ordinance, maps, on-line training (via PowerPoint presentation), workshop, conferences, DWR and FEMA contacts.

Division of Planning and Local Assistance

http://wwwdpla.water.ca.gov/cgi-bin/home.pl
programs and activities, publications (refer to Reports Administration web site), plus links to the four DWR district offices and their local programs.

Northern District:
http://wwwdla.water.ca.gov/nd/index.html
San Joaquin District:
http://wwwdpla.water.ca.gov/sjd/home.html
Central District:
http://wwwdpla.water.ca.gov/cd/home.html
Southern District:
http://wwwdpla.water.ca.gov/sd/home.html

Model Landscape Ordinance
http://wwwdpla.water.ca.gov/cgi-bin/urban/conservation/landscape/ordinance/
Assembly Bill 325, the Water Conservation in Landscaping Act of 1990, required that DWR develop a Model Water Efficient Landscape Ordinance. The ordinance, which went into effect January 1, 1993, promotes water-efficient landscapes and water management programs. Site offers background and provisions.

DPLA Program Web Sites

California Irrigation Management Information System (CIMIS)
http://wwwdpla.water.ca.gov/cgi-bin/cimis/cimix/hq/main.pl
CIMIS is a repository of climatological data collected at more than 85 computerized weather stations statewide.CIMIS's goal is to help improve water and energy management through efficient irrigation practices.

Municipal Water Quality Investigations Home Page
http://wwwdpla.water.ca.gov/supply/sampling/mwq/main.htm
The mission of the Municipal Water Quality Investigations Program is to determine and evaluate the sources of contaminants that affect the drinking water quality of the Sacramento-San Joaquin Delta. Program objectives are to alert water agencies about current and potential contaminants in Delta water supplies, to assist water supply agencies in planning, protecting, and improving drinking water sources and water supply facilities, and to document water quality under a variety of hydrologic conditions for studying water transfer alternatives, water quality standards, and predictive modeling capabilities.

San Joaquin Valley Drainage Implementation Program (state-federal)

http://wwwdpla. water.ca.gov/ agriculture/drainage/implementation/hq/title.htm
information on management plan for agricultural subsurface drainage and related problems on the westside San Joaquin Valley, including memorandum of understanding, members, program activities.

Division of Operations and Maintenance Program Sites

Operations Control Office
http://wwwoco.water.ca.gov/
functions, Project Operations Center, SWP operations reports, scheduling and outage reports, and links to Delta Environmental Compliance reports and US Corps of Engineers Flood and Operations Guidelines for the SWP.

Delta Environmental Compliance Section
http://wwwoco.water.ca.gov/cmplmon/CMhome.html
Delta operations summary, water quality and hydrologic conditions, Bay-Delta standards, Delta smelt, winter run salmon.

SWP Water Quality Program
http://wwwomhq.water.ca.gov/wq/wqhome page.html
data on concentrations and distribution of chemical, physical, and biological parameters at more than 30 sites in the California Aqueduct and associated reservoirs.

State Water Project Analysis Office

http://wwwswpao.water.ca.gov/
general information, programs (water acquisition and transfer, water rights, state federal water contract activities, SWP water contracts, SWP cost allocation and repayment, power supplies, publications, what's new).

Division of Engineering

http://wwwdoe.water.ca.gov/
services, bid and spec information, current projects, links, what's new at DOE.

Division of Safety of Dam

http://damsafety.water.ca.gov/
organization, responsibilities, contacts, jurisdictional dams, statutes and regulations, technical references, links.

Office of Water Education

http://wwwdwr.water.ca.gov/owe
general information, water safety program, educational and visitor services, Internet information.

Graphic Services
http://wwwdwr.water.ca.gov/owegs/
services available for photography, graphic design, film/video, and audiovisual. Also listing of videos available for loan from their library.

Water Facts & Fun
http://wwwdwr.water.ca.gov/dir-dwr_publicationsR2/dir-water_fact_fun_catalog/HTML/Homepage.html
Educational materials on water for teachers including student workbooks, teachers' guides, resource materials, hands-on activities, flannel-board stories, posters, and special offers.

Looking for another state government agency?

Search and Index of California State Government Agencies
http://www.ca.gov/s/search/hello.html

DWR Director David N. Kennedy has announced that he will retire at the end of this year. Director Kennedy spoke with DWR News about some of his perceptions after 15 years at DWR's helm. A companion article by Anita Garcia-Fante, Chief of the Office of Water Education, highlights DWR activities during Mr. Kennedy's tenure as Director.

- DWR DIRECTOR -
David N. Kennedy

sees a common quality in many of the individuals who built California and America's infrastructure of water systems, highways and other great public works.

That quality might be described as public service with an immediacy of purpose.

"They came from an era when adequate water, transportation and education were not taken for granted," Kennedy said. "And they knew the infrastructure to provide these things would not be built unless strong leadership built them."

Among the leaders in building California's water infrastructure Kennedy has known personally are former Gov. Edmund G. "Pat" Brown and all former DWR Directors.

When Governor George Deukmejian asked Kennedy to become DWR Director in 1983, Kennedy discussed the offer with William R. Gianelli, who had been Director under Governor Ronald Reagan.

Gianelli urged Kennedy, then Assistant General Manager of the Metropolitan Water District of Southern California, to go to Sacramento.

"Bill has a very strong sense of public service," Kennedy said. "He and Bill Warne (the late William E. Warne, DWR Director under Governor Edmund G. Brown) had a very strong belief in providing facilities to meet the public's needs."

Kennedy studied civil engineering because he also attaches importance to public works projects such as dams, aqueducts and highways in meeting society's needs.

If he could engineer time, would Kennedy prefer to serve as DWR Director now or back when construction was just beginning on the massive State Water Project?

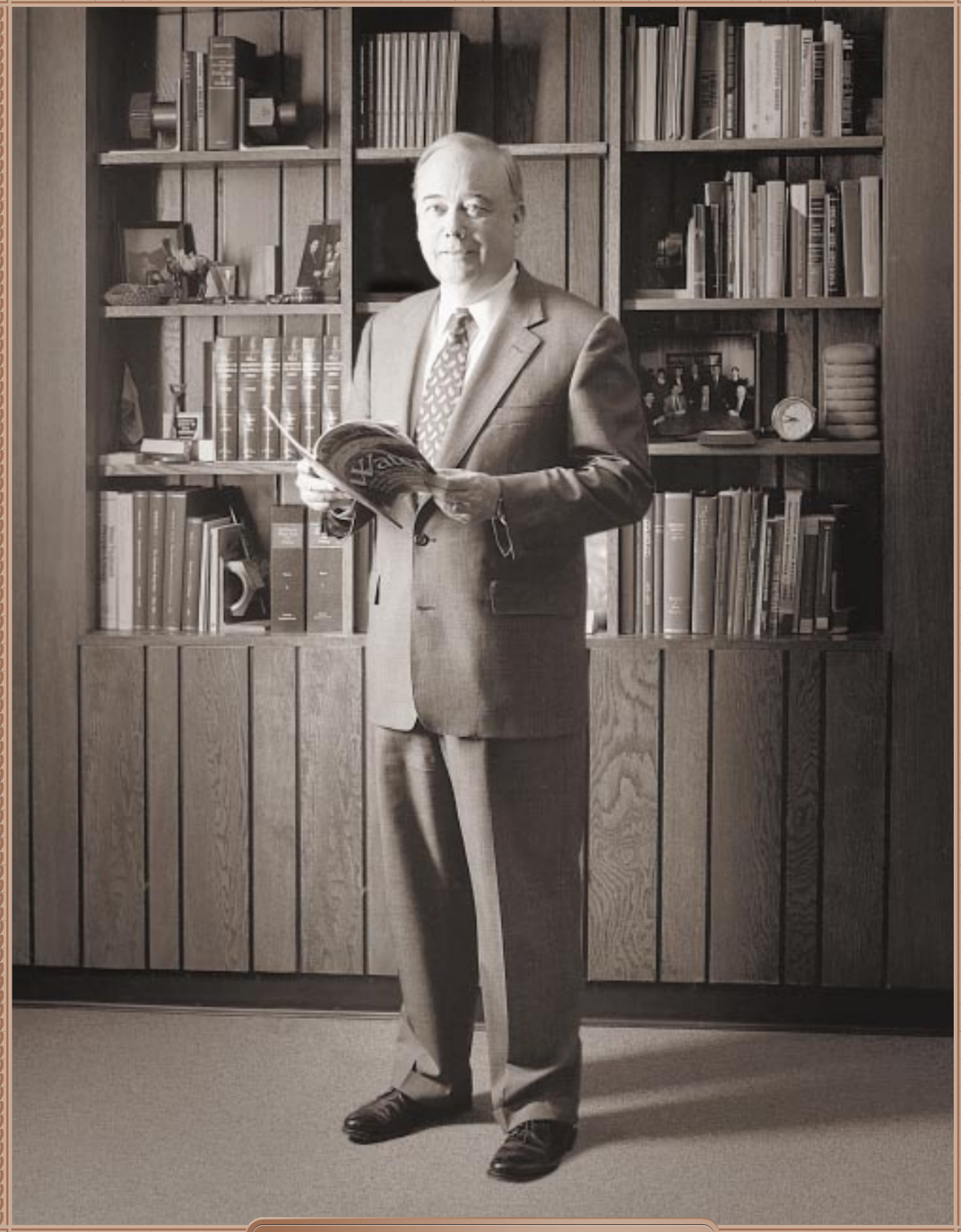
"I don't have a personal preference as to whether you're building a system or maintaining and expanding that system," Kennedy said. "It's just as interesting to assure that a system is well maintained as it is to build it. And I think that over the last 15 years we have averaged about a hundred million dollars a year in construction, including the North Bay Aqueduct, East Branch Enlargement, Coastal Branch, and now the East Branch Extension."

Kennedy was on the scene as a young DWR engineer in the early years of construction of the State Water Project. Just out of the U.S. Army Corps of Engineers, the former lieutenant's first DWR job in 1962 was working on aqueduct design, helping bring reality to the water system that Governor Brown had pushed through the Legislature.

Kennedy's second DWR job included reconnaissance-level planning for the proposed Dos Rios Dam in Mendocino County that would have tapped the free-flowing Eel River.

Governor Reagan, who had defeated Brown at the polls

Article by Ted Thomas - Portrait by Norm Hughes



David N. Kennedy, Director 1983-1998

to become Governor, killed the Dos Rios Project because it would have flooded an Indian reservation in Round Valley.

The Eel River still runs wild today.

Kennedy was flown by light plane over the Eel River canyon right after the monstrous flood of 1964.

"It was one of the most awesome things I ever saw," Kennedy recalled of the wreckage in the wake of the Eel's path.

By the time Dos Rios was put on the shelf by Governor Reagan in 1969, Kennedy had taken a position with the Metropolitan Water District of Southern California. He was promoted to Assistant General Manager in 1974.

Sound management principles have permitted DWR to adjust to changing political and social priorities without losing its identity, Kennedy said.

"The regulatory framework that the Department has to operate in today is just so different than what existed 30 or 35 years ago," Kennedy said. "With environmental and other issues, it's a different world and some agencies get ideologically driven rather than getting their facts straight."

"We've tried hard not to let ideology drive the analysis," Kennedy said.

Kennedy said DWR has been willing from the beginning to spend money to protect the environment.

Engineering flood control, water delivery and environmental protection is a dynamic responsibility that Kennedy believes DWR employees manage well.

"Department people really are well motivated," Kennedy said. "They enjoy working on projects that bring public benefit."

Here again is the concept of public service, which DWR can trace far back into its history.

Kennedy downplays comments that he would have made more money outside the Department.

"You never know what's going to happen," he said. And, he adds, he agrees with Bill Gianelli that public service is more important than a higher salary.

"I don't have a personal preference as to whether you're building a system or maintaining and expanding that system," ***Kennedy explains.*** *"It's just as interesting to assure that a system is well maintained as it is to build it."*

Kennedy does not follow anyone's book on management style, but supports Department employees and has an eye for talent.

Once, when told it was to his credit that he filled top DWR positions from within the Department rather than searching outside, Kennedy responded that the credit lay with the Department.

Director Warne, and others, Kennedy said, built strong systems of management and accountability into DWR that brought the State Water Project to completion "on time and within budget" and continue to serve the Department well today.

"At the time the State Water Project was built, we included every environmental protection that was known at that time, including a temperature control outlet at Oroville that was very expensive and innovative for its day."

As Director, Kennedy has helped to shape agreements that orchestrate the movement, storage and uses of water controlled by the State to increase benefits for all users. And the 1994 Monterey Agreement gives the agencies that purchase water from the State Water Project more operational flexibility to maximize the benefit of water.

"But I think the part people sometimes miss is that it isn't only an obligation. It provides a lot of satisfaction and it's an interesting way to spend your life."

What post-DWR plans does Kennedy have? He says they are not specific, but he and his wife will continue to reside in Sacramento.

Travel, reading and pursuing a developing interest in astronomy also are on the agenda.

Kennedy is amused when it is suggested that he write a book on California water issues.

"It's not necessary," Kennedy laughs. "Everybody in California water already has all the answers."

A Look Back

AT THE DEPARTMENT OF WATER RESOURCES

1983 - 1998

When David N. Kennedy took the oath as DWR's new Director on June 22, 1983, he and his staff were faced with the aftermath of a divisive battle over the Peripheral Canal, and new challenges in the water field. What follows are some of the major work completed during the span of 15 years.

Attitudes toward managing and protecting the State's natural resources have dramatically changed since 1957 when the DWR's first comprehensive water plan was published.

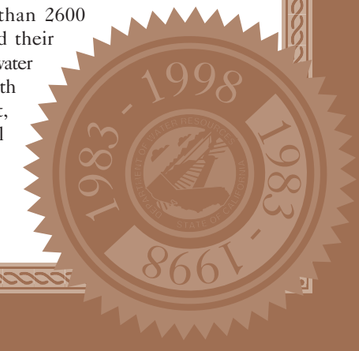
Through the 1960s and the early '70s, the Department designed and constructed one of the largest State multipurpose water projects in the United States. Financed by the Burns Porter and Central Valley Project acts, DWR built a water storage and delivery system of reservoirs, aqueducts, pipelines, powerplants and pumping plants that extends for more than 600 miles—spanning two-thirds the length of the State. It brought water and associated economic benefits to the San Francisco Bay area, the San Joaquin Valley, and Southern California.

While the Project was being built, however, public awareness and concern for protecting the environment were sharply rising. New and revised State and federal laws have reflected this sentiment, as exhibited in the National Environmental Policy Act (1969), the California Environmental Quality Act (1970), the California Wild and Scenic Rivers Act (1972), the Clean Water Act amendments to the Federal Water Pollution Control Act (1972 and 1976), the Federal Endangered Species Act (1973) , the California Endangered Species Act (1984), and numerous other federal and State statutes regulating toxins and pollution.

Concerns about the environment have also bolstered the widespread public view that water supplies must be clean and dependable. The need to protect the environment while making sure we have adequate water supplies has stimulated competition among urban, agricultural, and environmental interests over the use of the State's limited water resources.

Without question, these attitudes and laws have made a major impact on how the DWR and other federal, State, and local agencies, manage the State's water resources and the State Water Project.

The following list of projects performed by DWR's employees during the past 15 years reflects these societal changes. The list represents a significant body of work, but by no means, covers all the work performed by DWR. Many projects were not included due to space limitations. A number of the listed projects are multi-agency efforts and could not have been completed without major assistance from numerous federal, State and local agencies, and stakeholders. "DWR News" salutes the more than 2600 employees who contributed their talents to managing the State's water resources, in cooperation with other agencies, to protect, restore, and enhance the natural and human environments.



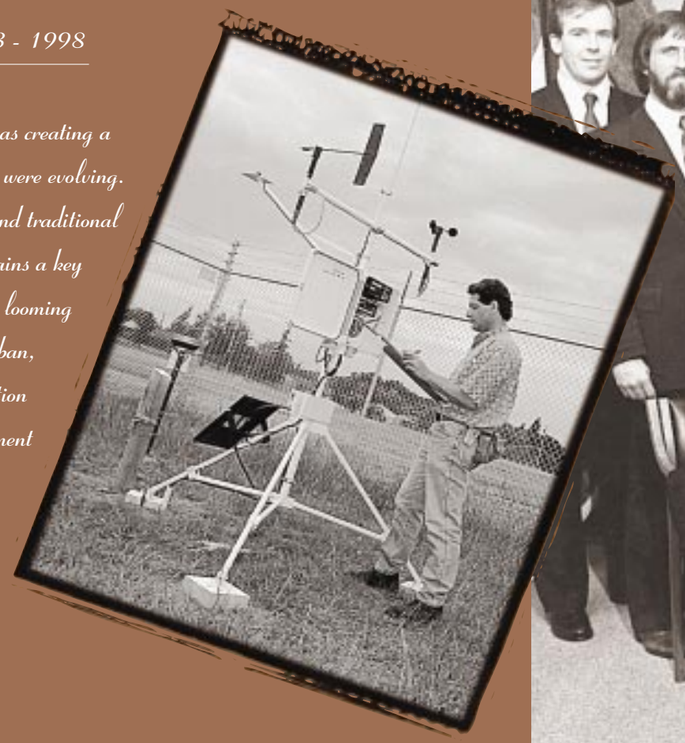
Article by Anita Garcia-Fante

Water Management

1983 - 1998

Looking Back- The Kennedy Years: 1983 - 1998

By 1983, concern about the environment was creating a changing atmosphere in which water policies were evolving. Such policies reflected the need to look beyond traditional water management approaches. Water remains a key issue for the State, with predicted shortages looming in the future. How to best serve all users-urban, agriculture, and the environment-is the question that will shape California's future management of its water resources.



1982

California Irrigation Management Information System (CIMIS)

DWR begins providing CIMIS weather data to farmers to help them determine when crop fields should be irrigated and how much water should be applied. Developed by the Department and the University of California at Davis, CIMIS data can also be used to produce irrigation schedules for parks, golf courses, and other large landscape areas. Eight-five computerized weather stations containing climatological data can be accessed for free, 24 hours a day through modems and the Internet.

1986

Coordinated Operation Agreement (COA)

After more than 25 years of negotiations, the agreement between DWR and the U.S. Bureau of Reclamation is signed. The COA sets forth the basis for operating the SWP and CVP to ensure that each project receives an equitable share of the Central Valley's available water, and guarantees the two water projects will operate more efficiently in combination. The major provisions are:

(clockwise)
CIMIS is established to help irrigators. The COA is signed, merging the water operations of CVP (Shasta Lake) and SWP (Lake Oroville) facilities.

1) commits the USBR to meeting Delta water quality standards set by D1485,

2) enables DWR to contract with USBR to buy interim federal water for the SWP,

3) allows DWR to wheel federal water through the California Aqueduct for federal contractors, and

4) enables the USBR to initiate the contract process for sale and delivery of additional CVP water.

1987

Administration of State G.O. Bonds for Loans and Grants to Local Government (Propositions 25, 44, 82, 204)

DWR begins providing loans to local water districts for capital outlay water conservation programs, including such projects as the lining of irrigation canals and the replacement of leaking water mains and laterals. Funding is also provided for groundwater recharge and local water supply projects.

1987

Update of California Water Plan Update, Bulletin 160-87

DWR completes the fifth update since the bulletin was mandated in 1957 to assess California's water use, forecast future usage, and recommend solutions in years of shortages. This report states that in most years the State's water resources will meet its needs. In dry years however California must withdraw stored water from reservoirs and groundwater basins. With a diverse range of water management approaches, rationing should rarely be necessary.

1990

Truckee-Carson-Pyramid Lake Water Rights Settlement Act

The Settlement Act is the result of several years of negotiations between the States of California and Nevada. Among other things, P.L. 101-618 provides for apportionment of water between the two States. The Act also provides a framework for settlement of most of the longstanding litigation over water rights in the area, including lawsuits filed by the Pyramid Lake Paiute Tribe. DWR represented the State of California in negotiating the Settlement Act, and continues to represent the State in the Truckee River Operating Agreement negotiations. The TROA must be completed and analyzed in EIS/EIR pursuant to NEPA and CEQA, and adopted as a federal regulation before most provisions of the Settlement Act, including the interstate apportionment and settlement of litigation, enter into effect.

1992

Governor's Water Policy

After negotations with local water agencies, environmental groups, DWR and other state and federal agencies, Governor Pete Wilson announces a long-term comprehensive water policy framework to bring an end to water wars that have resulted in polarization and paralysis among urban, agricultural, and environmental sectors. The policy includes:

1) fix the Delta via a CEQA-NEPA* investigation (with oversight by Bay-Delta committee) of solutions,

2) build more off-stream storage facilities,

3) reduce ground water overdraft,

4) promote water marketing and transfers,

5) restore and enhance fish and wildlife populations,

6) conserve water,

7) recycle water,

8) desalinate water,

9) transfer the federal CVP to State control, and

10) bank Colorado River water.

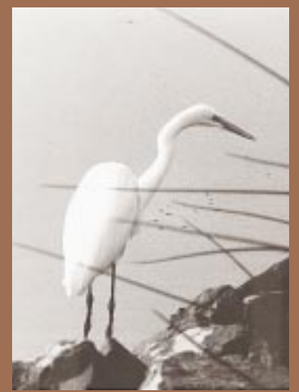
*California Environmental Quality Act - National Environment Policy Act

1993

California Water Plan Update, Bulletin 160-93

DWR publishes its sixth Update. This is the first report to present drought and average year water budgets and to quantify environmental water demands. The report states that Southern California is losing a portion of its Colorado River supplies to other States while in-State demands are growing. Urban areas are beginning to run short of water and are looking at ways to manage existing supplies efficiently and augment supplies where necessary. More water is also needed by the environment, as was clearly shown during the 1987-1992 drought.

Bulletin 160-93, based on the Governor's Water Policy, includes completing the SWP facilities in the South Delta. Water transfers, water marketing, and water banking will play a larger role in the future. Only with "demand management" techniques, such as conservation and transfers and new facilities, can demands be met.



(top) Governor Wilson signs Framework Agreement for water supply reliability and wildlife protection. Bulletins 160-87 and 160-93 detail current water useage and forecast shortages in relation to future growth of California's population and economy.

"In July Governor Wilson... reaches a compromise resulting in a historic "Framework Agreement."

1994

Framework Agreement & Bay- Delta Accord

In July Governor Wilson, in coordination with various federal agencies, reaches a compromise resulting in a historic "Framework Agreement." The Agreement consists of a process designed to provide more reliable water supplies for Northern and Southern California. It also provides a process for the protection of wildlife in the Bay-Delta ecosystems and prohibits the listing of more endangered species. The Agreement pledges that State and federal agencies would work together in three areas of Bay-Delta management: 1) establishment of water quality standards for the Bay-Delta estuary; 2) coordination of the State Water Project/Central Valley Project operations with endangered species, water quality and CVP Improvement Act requirements; and 3) establishment of long-term solutions to problems in the Bay-Delta estuary.

This effort triggers the formation of CALFED, a State/federal organization charged with developing long-term solutions for the Bay-Delta estuary. In addition, the Bay-Delta Advisory Council is formed with a membership of more than 30 citizen-advisors selected from California's agricultural, environmental, urban, business, fishing, and other interests.

The Framework Agreement also sets the direction for the unprecedented "Bay-Delta Accord," which is signed by the Governor and other federal representatives in December. The Accord sets new interim water quality standards for the Bay-Delta for three years, provides for new "nonflow" projects (e.g., fish screens and ladders) to protect the Bay-Delta ecosystem, and prohibits additional listing of species in the Bay-Delta for the next three years.

1994

Monterey Agreement between D.W.R. and the State Water Contractors

The Agreement changes the way the SWP allocates, stores, and sells water. Among other things, provisions include:

•.Water allocated in times of shortage will be based on contractual entitlement. (Previously allocations were based on need and historical use.) Now when shortages occur, agricultural and urban contractors are treated equally.

•.DWR would turn over the Kern Fan Element to the Kern Water Bank Authority in exchange for permanent retirement of 45,000 acre-feet of water entitlement by agricultural contractors.

•.When needed, the stored water in Perris and Castaic reservoirs could be used by contractors to more efficiently manage local water supplies.

•.Contractors could transport non-SWP water through SWP facilities and store water outside their service areas until needed.

•.A new interruptible water service program would allow contractors to take delivery of available uncontrolled flows in the Delta in proportion to their entitlement for the year, when DWR determines such supplies exist.

•.Funds would be managed to create more stable water rates. DWR will estimate its revenue needs for the following year and then reduce the billing to the contractors so that only that amount of revenues will be collected.

1998

California Water Plan Update, Bulletin 160-98

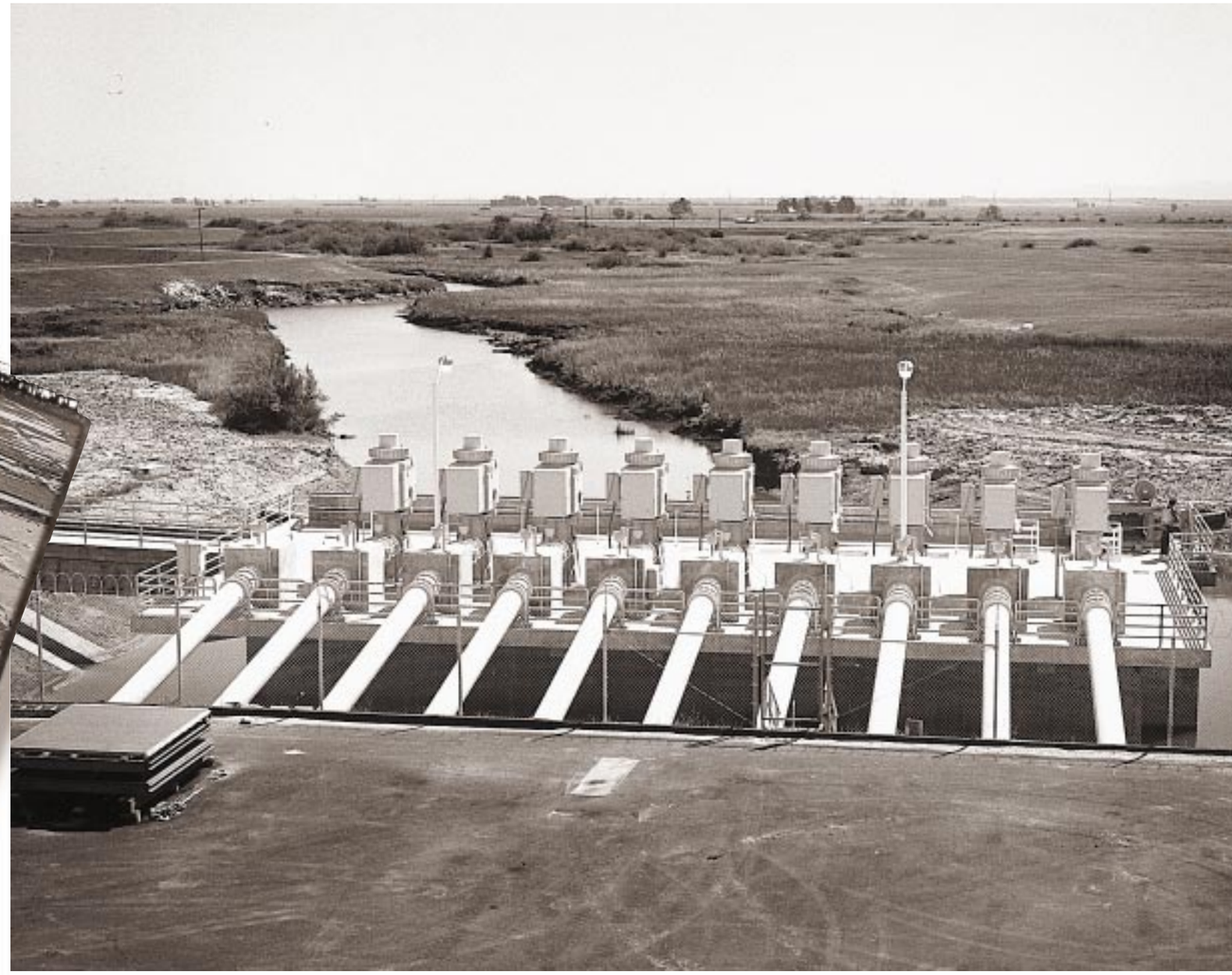
DWR's seventh Update states if no action is taken to improve water supply by 2020, Californians will be short an estimated 7 maf during a drought and 2.9 maf in an average year. By the year 2020, if currently planned facilities and water management actions are put into place, California will still fall short: in a drought year by 5.2 maf; in an average water year by 1.6 maf.

"DWR's seventh update states if no action is taken by 2020, Californians will be short an estimated 7 maf during a drought and 2.9 maf during an average year."

Monterey Agreement affects Castaic Lake's operations (opposite page); Bulletin 160-98 is completed, predicting shortages by 2020 and a population of 47.5 million.

Looking Back: 1983 - 1998

Over the past 15 years, DWR has focused on completing construction of SWP facilities including its most recent, the Coastal Branch. Work continues on an extension of the East Branch to better meet the water needs of Southern California. A faster, improved communications network and Project Operations Center were also inaugurated, as well as projects to ensure water supply reliability for its contractors and improve water quality in the Delta.



1985

Thermalito Diversion Dam Powerplant

The plant's one generating unit utilizes Feather River fishery releases at the Thermalito Diversion Dam to generate electrical energy.

1986

Alamo Powerplant

Alamo recovers electrical energy from water delivered through the East Branch of the California Aqueduct. It is designed to house a second turbine which will almost double the plant's capacity.

1986

North Bay Aqueduct

DWR completes the North Bay Aqueduct, an underground pipeline that delivers 67,000 acre-feet a year to Solano (42,000 af) and Napa (25,000 af) counties. It begins at Barker Slough Pumping Plant, then goes through the cities of Vacaville and Fairfield to the Cordelia Pumping Plant. At Cordelia, water is delivered to Napa, Benicia, and Vallejo. The pipeline's initial design was realigned to avoid vernal pools and cultural resources.

1986

Fiber Optics Installation Along Aqueduct

Fiber optic cable is buried along 446 miles of the Project from Banks Delta Pumping Plant to Devil Canyon Powerplant. It connects the five field divisions' area control centers, reservoirs, pumping and hydroelectric plants, and 66 check structures.

More than 9,000 acres are purchased on Sherman Island (top left). North Bay Aqueduct (top right) is completed to serve Napa and Solano Counties. Two new power plants added: Alamo (left) on the East Branch and Thermalito Diversion Dam (above) at Oroville.

1988

Kern Fan Element & La Hacienda Groundwater Purchase (1991)

DWR buys 19,900 acres adjacent to Kern River for approximately $31 million. The DWR property called the Kern Fan Element overlies a major ground water basin and is located close to the California Aqueduct. DWR also buys 98,005 acre-feet of groundwater from La Hacienda. (DWR transfers the property and water in 1996 to the Kern Water Bank Authority and agrees to the option of leaving the deposit in the ground or, if needed, extracting only up to 15,000 acrefeet per year. When pumped, delivery would be restricted to within Kern County borders.)

1990

Sherman Island Property Purchased

DWR purchases 9,183 acres on Sherman Island, a West Delta island that plays an important role in the long-term reliability of a water supply to the State Water Project, the Central Valley Project, and Contra Costa Canal. Because the island is located where the fresh and salt water mix, flooding of the island

would adversely affect the water quality. Acreage is purchased with the intent to fix nonproject levees, create and maintain wildlife habitat, and provide land use options that maintain the integrity of the island by reducing the rate of land subsidence.

1992

Four Additional Pumps at Banks Delta Pumping Plant

New pumps are installed to boost the plant's maximum pumping capacity from 6,400 to 10,300 cfs. The additional pumps' main purpose is to allow a small increase in winter pumping and more pumping during the night when electricity is cheaper. They also act as backup in case of failure. Mitigation for the new pumps is negotiated with the California Department Fish and Game (see Four Pumps Agreement, 1986, under Environment section).

1992

Twitchell Island Property Purchase

DWR purchases the property to control subsidence and soil erosion on the island. DWR manages the property to provide agricultural and wetland/wildlife habitat, flood control, water quality and supply reliability, and additional recreational opportunities in the Delta.

1995

New Project Operations Center (POC)

The new POC is located in a new Joint Operations Center building in northeast Sacramento. The center can remotely operate the entire SWP. In 1998 the new communications and control system is completed to provide more detailed information on equipment status at remote facilities, faster data updates of changes as they occur, and a more fault-tolerant, reliable system. The software system can be easily modified as operational needs change. The database reaches 70,000 monitor-and-control points, with a fast and easy-to-navigate display system. Additionally, all water and power scheduling for the SWP is accomplished at the new POC.

1996

East Branch Enlargement - Phase 1

DWR completes the first phase of the enlargement project, which will carry increased water deliveries requested by the Metropolitan Water District of Southern California, the SWP's largest contracting agency. MWD needs more water for its eastern and southern service areas experiencing rapid development.

Ground is broken for Coastal Branch (top). Project Operations Center moves (upper left). The East Branch is enlarged (left). Silverwood Lake gets new intake tower.

The enlargement includes:

- raising the canal lining 4 feet from Alamo to Mojave Siphon (1988);
- modifying overcrossings, check structures, siphons, and operating roads, and adding barrels and check gates along aqueduct;
- enlarging Devil Canyon Powerplant, adding two turbines to boost capacity to 294 megawatts, adding a second afterbay to boost power production and increase flexibility (1994);
- enlarging Pearblossom Pumping Plant, adding three units and new discharge lines (1995); and
- completing Mojave Siphon Pumping Plant (1996, conditionally operational).

"The new pipeline will help the Central Coast handle droughts, groundwater overdaft... on a statewide basis."

1997

New San Bernardino Tunnel Intake at Silverwood Lake

Under FERC order, DWR replaces the intake tower at Silverwood, which could have been damaged by an earthquake. The unique "Y" or funnel-shaped intake tower is 125 feet and draws water from one or a combination of four different lake levels. (About 15 million people in Southern California depend on water from Silverwood Lake.)

1997

Coastal Branch Project Completion - Phase 2

DWR completes a 102-mile pipeline from Devils Den to Vandenberg Air Force Base in Santa Barbara County. The Coastal Branch annually brings 4,830 af of water to San Luis Obispo County and 42,986 af of water to Santa Barbara County. It consists of four pumping plants: three 6.7-megawatt pumping plants (Devils Den, Bluestone and Polonio Pass), which lift water 1,500 feet over Temblor Mountain Range; and the 2.2-megawatt Casmalia Pumping Plant, which lifts water 400 feet up the Casmalia Hills to the terminus tanks. Five tank sites along the pipeline provide operational storage and hydraulic control for this segmented pipeline.

The new pipeline will help the Central Coast handle droughts, groundwater overdraft, and water marketing and transfers on a statewide basis.

Emergencies

Looking Back: 1983 - 1998

Public safety is one of DWR's principal functions. Such responsibilities involve the work of hundreds of DWR employees and those of other State, federal, and local agencies. From 1983 to 1998, these workers would witness and labor in some of the worst floods and droughts on record. Others would oversee repairs to the SWP system as it was impacted by such emergencies and urgencies of its own. But in the end each experience would gain lessons learned.

1986

Flood Fight

Rainfall between February 12 and 21 creates record flows into rivers and reservoirs across the north central part of the State. The Sacramento River system's peak discharge of about 650,000 cfs into the Delta is the greatest flow ever recorded. Folsom, Black Butte, Pardee, and Camanche reservoirs fill beyond their normal full storage levels. Releases from Oroville Dam reach 150,000 cfs, exceeding the previous record of 85,000 cfs in 1980 since the dam was completed in 1968.

On February 19, waters from the Mokelumne River flood the McCormack-Williamson Tract, Dead Horse, and Tyler islands. Another Mokelumne River levee breaks February 20, flooding New Hope Tract and the town of Thornton. Later that same day a Yuba River levees breaks, inundating 10,000 acres and the towns of Linda and Olivehurst. Flooding also occurs on Van Sickle, Egbert, and Little Mandeville islands.

With 3,000 miles of levee threatened, the Flood Operations Center coordinates patrols and repair crews to survey areas for hazards. Several hundred people from DWR and local reclamation districts work around the clock during the emergency.

Director Kennedy (second from right) conferred with other State and local officals during the 1986 floods. Flood scenes were also common in 1993, 1995, 1997 and 1998.

1986,93,95

Arroyo Pasajero & Cantua Creek Floods

The Arroyo Pasajero drains over 500 square miles of mostly mountainous terrain in southwestern Fresno County. The SWP intersects the Arroyo's floodpath and forms a barrier to sediment-laden floodwaters that pour out of the Arroyo during heavy rainstorms.

As demonstrated in 1995 by the failure of twin I-5 bridges spanning the Arroyo just upstream of the California Aqueduct in 1995 and earlier floods that have caused widespread regional damage, the Arroyo Pasajero remains a significant threat to the SWP.

Arroyo flooding causes structural damage and breaches portions of the aqueduct.

Floodwaters emptying into the aqueduct leave heavy deposits of arroyo sediment on the aqueduct floor.

DWR nears the completion of a four-year flood control investigation partnership with the U.S. Army Corps of Engineers and Bureau of Reclamation. This long-standing aqueduct problem is now closer than ever to a solution that the State and federal water contractors impacted by Arroyo Pasajero flooding can support.

Emergencies

1987-92

Drought

The 1987-1992 drought ranks as the most severe drought in California's recorded history. By the end of the drought, all residents have been impacted to varying degrees, but the environment and agriculture have suffered the most.

Water reserves stored in the State's major water projects help minimize economic consequences to California's economy during the first four years, but are depleted in 1991 to the point where no SWP deliveries can be made to agricultural contractors and only 30 percent of requested deliveries to urban contractors. In 1992, storage in the State's major reservoirs falls to 54 percent of average, the lowest since 1977. The SWP delivers only 10 percent of urban requests, some 225,000 acre-feet.

During the second year of the drought, DWR opens the State Drought Information Center to provide drought information to the media and a wide variety of public and private organizations, and to give technical assistance to water-short areas.

In 1991 Governor Wilson issues an executive order which establishes a Drought Action Team to direct and coordinate State efforts to combat the effects of the drought. Director Kennedy is appointed to chair the team; and DWR is directed to provide technical drought assistance, facilitate water banking and marketing transactions between willing sellers and buyers, recommend actions to effect increased water savings for all State agencies, and expand the Drought Information Center.

1988

Mojave Siphon Pipeline Bursts

DWR crews respond quickly to a blowout caused by a break in the pipeline. The break's force creates a crater 40 feet in diameter, littering the area with mud, concrete fragments, and twisted utility lines. Water surging from a 4-foot-wide and 6-foot-high hole in the concrete pipe gushes 50 feet into the air. About 1,400,000 gallons are lost. DWR crews have the siphon back in operation in three weeks.

1989

Dam Safety Inspection Following Loma Prieta Earthquake

Earthquakes such as Loma Prieta, Landers (1992) and Northridge (1994) create significant additional work for DWR. Each occurrence calls for immediate need to inspect over 100 dams near the epicenter to evaluate and determine their condition. Follow-up work is also necessary to fully assess any damage that occurred and ensure that deficiencies were corrected. DWR staff reports of any damages observed on dams in the earthquake zone leads to investigations of similar structures outside the damage zone for preventative purposes.

Five earthquakes since 1989 have resulted in damage to more than 20 dams. These seismic events caused severe damage to several high hazard dams, even though the earthquakes were of considerably lower magnitude than that of the maximum credible earthquakes projected by geologic and seismologic study.

"Major seepage and badly cracked concrete panels are detected at various locations along the California Aqueduct..."

California Aqueduct's repairs (top and upper left). Drought (left) leaves marina high and dry at Folsom Lake. Safety of Dams engineers conduct post-earthquake inspections (bottom).

1991

Drought Water Bank

In 1991 DWR sets up the first water bank for purchasing water from willing sellers and transferring the water via SWP facilities to those with critical needs. Sellers such as farmers and water districts make water available for these banks by fallowing crops, releasing surplus reservoir storage, and substituting groundwater for surface supplies.

Staff from various parts of DWR help negotiate with sellers; prepare contracts; and provide operational, hydrologic, and environmental information needed to evaluate proposed transfers.

DWR repeats the water bank program in the water-short years of 1992 and 1994.

1993-98

Emergency Canal Repairs

Major seepage and badly cracked concrete panels are detected at various locations along the California Aqueduct, mainly at Pools 48, 49, and 52 along the East Branch. At most sites, the pool is lowered and sandbags and soil are placed to slow erosion. Emergency contracts are prepared for each site to replace the panels, install a waterproof membrane, and place shotcrete protective covers over the membrane.

1994

Castaic Dam Tower & Bridge Failure

DWR is currently preparing a contract to permanently repair the damaged portion of the bridge which was damaged by the Northridge Earthquake and temporarily repaired.

Emergencies

During the 1998 flood season, DWR staff provided training in flood fighting techniques to more than 4,500 people.

1995

Flood Fight

Record rainfall falls in January (and later in March), causing flooding, loss of lives, and property damage totaling millions in more than 50 counties. The new State-Federal Flood Operations Center forms around-the-clock shifts to alert emergency management agencies of high water flows as Northern California rivers rise above flood stage, endangering communities along their banks.

In the field, DWR levee inspectors and flood maintenance workers, reclamation districts, and other responsible parties patrol and report levee conditions along Northern and Central California rivers and in the Delta. Flood Inspection staff, trained in flood fight methods, are dispatched to coordinate flood fighting activities at threatened locations. DWR and other agencies operating the dams coordinate their releases so that flow rates and timing will not worsen impacts on downstream rivers already swollen by the rain.

1997

Flood Fight

Major rains strains flood control systems beyond the breaking point in January. Hundreds of DWR employees answer the emergency call, some working 36 or more hours non-stop.

For a short time on New Year's Day, DWR releases a record-breaking 160,000 cfs from the Oroville reservoir as inflows reach 302,000 cfs, the highest on record. Over a three-day period, 1.25 million acre-feet of water flows into the lake. The flood flows require close coordination with reservoir operators who needed to adjust releases to maintain flows within downstream channel capacities.

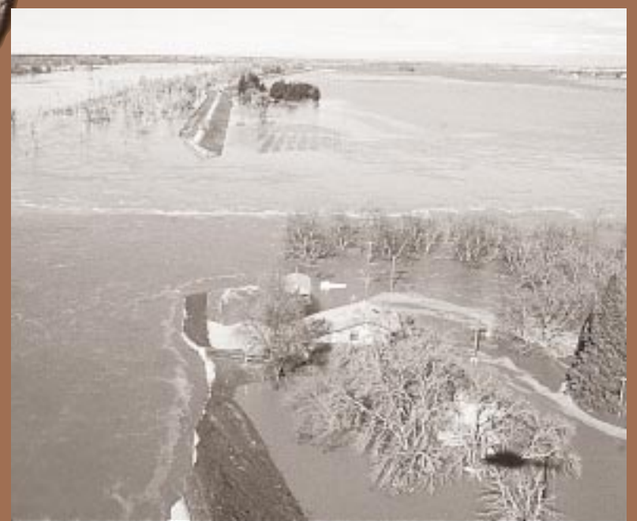
DWR responds to more than 200 flood incidents, with State resources stretched throughout the Central Valley. Working with the crews from the California Departments of Forestry and Fire Protection, Corrections, and the California Conservation Corps, DWR staff oversees repairs to levee boils, sloughing, and leakage. More than 30 breaks along the San Joaquin and Sacramento River systems are reported. Meridian is saved after a levee breaks along the Sutter Bypass by constructing a 6-foot ring levee. Under DWR supervision, several hundred CDF employees builds the U-shaped berm around three sides of Meridian. Relatively few levee breaks occur in the Delta. The COE assists with flood fight effort and emergency levee repairs at scores of locations.

During the aftermath, predictions of El Niño-driven storms motivate agencies statewide to prepare. Coordinating with the U.S. Army Corps of Engineers, DWR strives to repair damaged sites before the next flood season.

1998

Flood Fight

Following a January and February with more than twice the normal precipitation, a flood alert and mobilization begin on February 2 and continue through the month. During the alert, 124 incidents are reported. DWR establishes four Incident Command Centers at Colusa, San Luis, Butte, and Grizzly Island, providing assistance to local agencies.



Floodfighers' training in the art of sandbagging and levee protection came in handy to battle several major floods. Participants included individuals from communities statewide. Levee breaks along the Feather River, 1997 (bottom).

The 1997 flood experience and advance preparations in 1998 (provided through El Niño workshops statewide) prove invaluable. DWR staff provides training in flood fighting techniques to more than 4,000 people and installs telemetry at more than 70 new stream gaging stations. Recently trained in the Standard Emergency Management System, DWR staff also fill dozens of new roles during the emergency.

Delta experts report that the combination of high tides, high winds, and high river levels produces the most severe lashing that Delta islands have ever had to withstand. Yet, Delta levee improvement projects, and the efforts of a very proactive DWR staff, prevent any critical failures.

1998

Los Banos Reservoir High Water

Major storms threaten to cause excessive flood releases from the reservoir's spillway beyond the capacity in Los Banos Creek. DWR cuts a "notch" in the aqueduct to take excess flood flows from the creek, while the Corps of Engineers builds a berm to protect Los Banos.

1998

Emergency Repair at Edmonston Forebay

Broken and displaced lining panels are removed and replaced with articulating fabric-formed concrete and shotcrete. Virtually all work is performed under water.

Looking Back: 1983 - 1998

To mitigate for operating the SWP, DWR developed and funded a wide array of studies and constructed a number of facilities to protect and enhance fish and wildlife and their habitat. Facilities were built to protect a vital brackish water marsh and to keep fish away from pumps; staff were trained on environmental regulations during construction of the Coastal Branch, DWR's largest project built in a decade; and SWP operations were restricted during fish migrations through the Delta.

1983

Interagency Ecological Program Expansion

The program, created in 1970 to study the ecological resources of the Sacramento-San Joaquin/ San Francisco Bay Delta estuary, welcomes four additional agencies. These agencies, which include DWR, begin a number of interagency cooperative studies on an array of topics including fisheries, water quality, fish facilities, river and Delta flows, hydrodynamics, entrainment of eggs and larvae, and benthos.

These studies include: a boat and land-based regional water quality monitoring program for the estuary, studies of estuary's circulation and mining processes, monitoring programs on distribution and abundance of phytoplankton and zooplankton, reports on the fish resources of the Bay and Delta, establishment of real-time fish sampling and data reporting, and Delta surveys to determine the number and distribution of striped bass and delta smelt and their eggs and larvae.

1984

Suisun Marsh Protection Plan and E.I.R.

A plan of protection is designed to comply with SWRCB's Decision 1485, which sets specific water quality standards for water project operators to meet. The plan also includes mitigation for the effects of the CVP, SWP, and a portion of other upstream diversion projects. From 1987 to present, over $80 million is spent on improving wetlands.

From 1991 to the present, 32 water management facilities and fish screens in the marsh were completed. DWR constructs a number of water conveyance facilities and structures to improve the marsh's water quality.

(clockwise) Interagency studies aid the Bay-Delta estuary and the brackish water Suisun Marsh. DBEEP nabs poachers with speedy boats. Suisun gates improve water quality and protect marsh habitat.

1986

Suisun Marsh Salinity Control Gate

DWR installs a control structure in Montezuma Slough to control salinity levels in marsh channels and improve habitat for wildlife and fish within Suisun Marsh. This facility contains three radial gates to control the flow of water and includes a boat lock and flashboard structure, which allows the passage of boats and barges. The entire facility stretches about 600 feet across Montezuma Slough.

1986

Four Pumps Agreement

The Agreement between DWR and the Department of Fish and Game provides mitigation for direct losses of fish caused by pumping at the Banks Delta Pumping Plant. It is negotiated as a part of the program to

install the four extra pumps at Banks. The Agreement includes a $15 million component to compensate for the fact that direct losses today would probably be greater if fish populations had not been deplected by past operations.

The negotiations brings together many organizations including United Anglers; Pacific Coast Federation of Commercial Fishermen's Associations, Inc.; the Planning and Conservation League; and the State Water Contractors.

Under the Agreement, DWR obligates the $15 million, plus annual costs of about $500,000 to $2 million annually, for mitigation projects including salmon spawning gravel replenishments, water exchange projects, fish screens, fish ladders, fish migration barriers, wardens and equipment to reduce fish poaching, expansion and modernization of fish facilities, rearing and stocking of steelhead and striped bass, pens to improve the survival of hatchery-reared salmon, and isolation and reduction of salmon predator programs.

1986

Sacramento River Fisheries & Riparian Habitat Restoration Plan

In coordination with federal, State, local, and private organizations, DWR completes a management plan for the Sacramento River and its tributaries to protect, restore, and enhance both fisheries and riparian habitat, which were both recognized as being in decline. Under SB 1086, the plan includes specific action-oriented projects and a more conceptual riparian habitat plan. Projects currently being implemented include fish bypass structures or dam removals at diversions on Sacramento River tributaries and the Shasta Dam temperature control structure. The work also includes a recently published "Sacramento River Conservation Area Handbook," which instructs interested parties on how to restore and protect riparian corridor along 222 miles of the Sacramento River between Keswick and Verona.

1992

Skinner Fish Facility Expansion

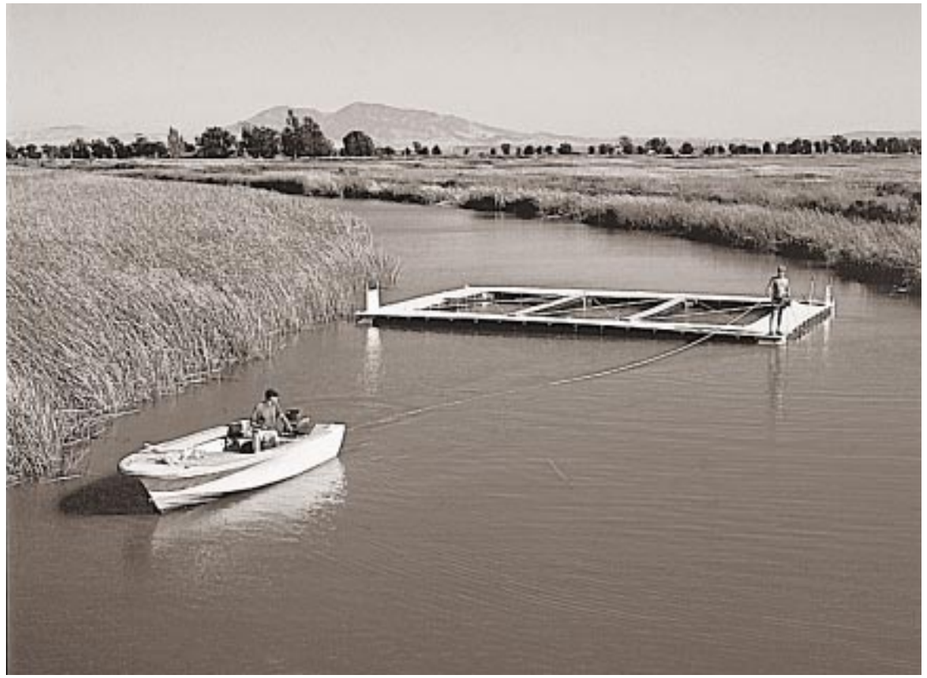
DWR upgrades the facility to reduce fish losses at Banks Delta Pumping Plant by improving hydraulic conditions in the fish bypass system. The project includes construction of three additional holding tanks for the fish collection and transport operations.

1992

Environmental Services Office

DWR establishes ESO to provide coordination and technical support on environmental issues. Headed by Randy Brown, ESO helps the Department comply with an array of environmental laws and regulations that affect State Water Project operations and development programs. To help DWR face complex environmental challenges, ESO staff works with local, State and federal agencies to help negotiate solutions and develop measures to avoid or minimize adverse effects that may result from SWP activities, or construction of a new facility. ESO also plays a major role in collecting and analyzing data for Interagency Ecological Program investigations on the Bay-Delta estuary. Such dataare used extensively by the Department, other agencies and consultants to prepare environ-mental impact reports, biological assessments, planning reports and other documents.

"DWR provides for mitigation projects including... pens to improve the survival of hatchery-reared salmon..."



Rearing pens raise striped bass in safety (top). A fence was built to keep blunt-nosed leopard lizards out of the Coastal Branch construction site (left).ESO Chief Randy Brown directs the work of more than 40 environmental specialists.

1993

DWR Environmental Training (In-house)

DWR establishes an environmental training program to provide employees with a better understanding of the environmental laws that affect their work. The training helps ensure that by using preventive measures, employees avoid mishaps involving endangered species.

1995

San Joaquin River Management Program

DWR coordinates with San Joaquin Valley interests to prepare a program which will improve the San Joaquin River Basin. More than 80 measures are being implemented to address the quality, flood control, habitat, fishery, recreation and supply issues of the San Joaquin River.

1995

SWP Operations to Protect Environment

In May the SWRCB adopts revisions to D1485 water quality standards proposed in the BayDelta Accord (see Framework Agreement and Bay-Delta Accord, 1994, under Water Policy Management). These standards plus biological opinions for winter-run salmon and Delta smelt significantly change SWP and CVP operations. The changes reduce the project's potential effects on the Delta fisheries while providing more flexibility and reliability to the project operators. Changes in operations reduce the overall deliveries of the two projects significantly.

These operational changes include:

- closing the Delta Cross Channel gates during critical salmon outmigration periods to provide a more direct route to the ocean;
- restricting exports during specified fish migration periods; and
- adding water quality conditions to restrict salinity intrusion.

1995

Formation of CALFED Operations Group

The group includes State and federal regulatory agencies and stakeholders who meet monthly in a public forum to identify and seek consensus on ways to minimize SWP/CVP impacts on fisheries, while meeting the two projects' contractual obligations.

Flood Management

Looking Back: 1983 - 1998

Flood control requires data, design, and construction of facilities, cooperation, and funds. Since 1983, significant strides have been made - levees rehabilitated, sediment removed, funds and technical assistance made availabl. Two new Flood Operations Center opened in Sacramento and Eureka, and water conditions data can now be accessed via the Internet. However, a major report indicates there is still much to learn and accomplish to ensure public safety.

1984

California Data Exchange Center

In cooperation with other agencies, CDEC is established to provide real-time hydrologic data and a centralized common database for many agencies. The system contains data on precipitation, stream and tidal stages, snow, temperature, flow and water quality, and reservoir operations. The system also stores daily and monthly data, including information from manually measured snow courses and manually observed precipitation stations and reservoir storage.

CDEC grows to include real-time data from over 480 precipitation stations, 240 stream gage and tide stations, 95 real-time snow sensors, 66 reservoirs, and 67 water quality stations. CDEC becomes a premiere water management and information tool for a host of users. In 1995, CDEC is made available on the Internet.

1985

Urban Streams Restoration & Flood Control Program

The program provides communities with funds and technical assistance to repair stream bank erosion, restore watershed stability, prevent local flooding, and clean up streams. To date, more that 180 projects have been completed.

1988

Delta Flood Protection Fund

Senate Bill 34 creates the Delta Flood Protection Fund to provide $12 million a year for flood protection in the Sacramento-San Joaquin Delta. Six million dollars of the fund goes for local assistance under the Department's Delta Levee Maintenance Subventions Program; the other $6 million goes to special flood control projects for eight western Delta island, the towns of Walnut Grove and Thornton, and other locations in the Delta and northern Suisun Bay.

The State-Federal Flood Operations Center (top) gets high-tech at their new locale in the Joint Operations Center (upper left). CDEC joins the information highway on the Internet. Grants go to restore urban streams (lower left).

1994

New Eureka Flood Center

The Eureka Flood Center moves to Woodley Island and shares quarters with the National Weather Service. The Eureka center is a one-person satellite office of the Flood Operations Center. It serves the North Coast communities during flood condiitions.

1995

New Flood Operations Center

A redesigned Flood Operation Center and Media Room move to the second floor of the Joint Operations Center in northeast suburban Sacramento. Joint river forecasting and flood information dissemination are performed by Flood Management's Flood Operations and Hydrology Branches in cooperation with the National Weather

Flood Management

Services' CaliforniaNevada River Forecast Center and Sacramento Weather Forecast Office.

The Center, modernized with new equipment, increases the accuracy, timeliness, and efficiency of DWR's flood emergency response. The Center also improves media accessibility and takes full advantage of the California Data Exchange Center hydrometeorological database.

1997

Flood Emergency Action Team (FEAT)

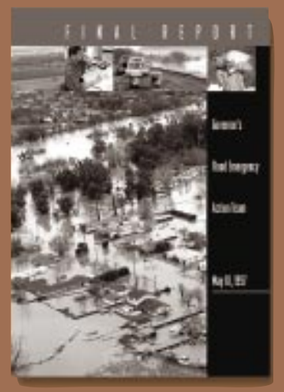
In the midst of the disastrous winter storms, Governor Wilson creates FEAT to identify the short-term and long-term flood management challenges facing California. FEAT members complete a comprehensive report making 65 recommendations arranged in four categories: emergency response, floodplain management, flood control system restoration and improvement, and further studies.

Following the FEAT recommendations, the Governor orders a wide-ranging series of actions including investing nearly $31 million over the next two years in flood-control facility improvements. The Governor also signs two executive orders aimed at upgrading California's emergency response system and creating a Floodplain Management Task Force.

1998

Statewide Floodplain Mapping Program /Comprehensive River Basins Study

Work is under way for mapping 11 creeks and rivers in Northern and Central California, including a reach of the Feather River at Oroville and the San Joaquin River upstream of Fresno. Flood levels determined by DWR mapping will be used by communities to carry out floodplain management objectives of the National Flood Insurance Program.



A comprehensive study of the Sacramento and San Joaquin River Basins is funded to examine strategies to improve flood management and restore riparian habitat throughout the Central Valley. The four-year study will produce an interim report to Congress by April 1999 and a final report and programmatic EIS/EIR.

FEAT report recommends flood control activities. Cache Slough Mitigation Bank established (middle). Urban levees are restored in the Sacramento area.

Flood Contol Projects

The following lists projects completed by the State Reclamation Board, which is an independent board administratively under DWR but functions with the assistance of DWR staff.

1983

Major Sediment Removal

From 1983 to 1996 more than 8 million cubic yards of sediment is removed from the Colusa and Tisdale bypasses, the Yolo Bypass at Fremont Weir, and the Cherokee Canal. This work restores the design flood-carrying capacity of these critical features of the Sacramento River Flood Control Project.

1984

Cache Slough-Yolo Bypass Cross Levee Project

DWR constructs a new 3,000-foot levee across a wedge-shaped peninsula at the southern end of the Yolo Bypass. The existing federal project levees, surrounding the tip of the peninsula, had been subsiding for decades and were difficult to maintain. After the construction of the cross levee, the old levees are deauthorized and excluded from the Sacramento River Flood Control Project. A mitigation bank is established in the area of the old levees.

1992

Fairfield Vicinity Streams

The project, which includes enlarged channels on five streams in and adjacent to the city of Fairfield, will provide for 100-year protection to urban and agricultural areas that have been subjected to frequent flooding. Total project cost is about $40 million.

1993

Cache Creek Settling Basin

Levees surrounding the Cache Creek Settling Basin are raised 12 feet, and the outlet weir by 6 feet. The project will provide for 50 years of sediment storage capacity for Cache Creek's heavy sediment load, preventing about one million cubic yards annually from being carried into the Yolo Bypass. The total cost of the project is $22 million.

1993

Sacramento Urban Area Levee Reconstruction

Working with the U.S. Army Corps of Engineers and the State Reclamation Board, DWR assists with the rehabilitation of 32 miles of Sacramento urban levees to restore their structure and integrity. Certain stretches of levees along the Sacramento River are upgraded, either by placement of a slurry wall inside the levee (to stop seepage) or a stability berm at the landside toe. In addition, the river wall in Old Sacramento is strengthened.

1994

Cache Slough Mitigation Bank

The levees outside the new cross levee surrounding the tip of the peninsula are breached in two locations, and the previously dry area is allowed to flood. Two islands are constructed and vegetation planted in the flooded area and the interior banks of the levees are also planted. The intent is to create the first "mitigation bank" to provide riparian habitat for the Sacramento River Bank Protection Project. The area also provides unanticipated benefits as a spawning and rearing area for delta smelt.

1995

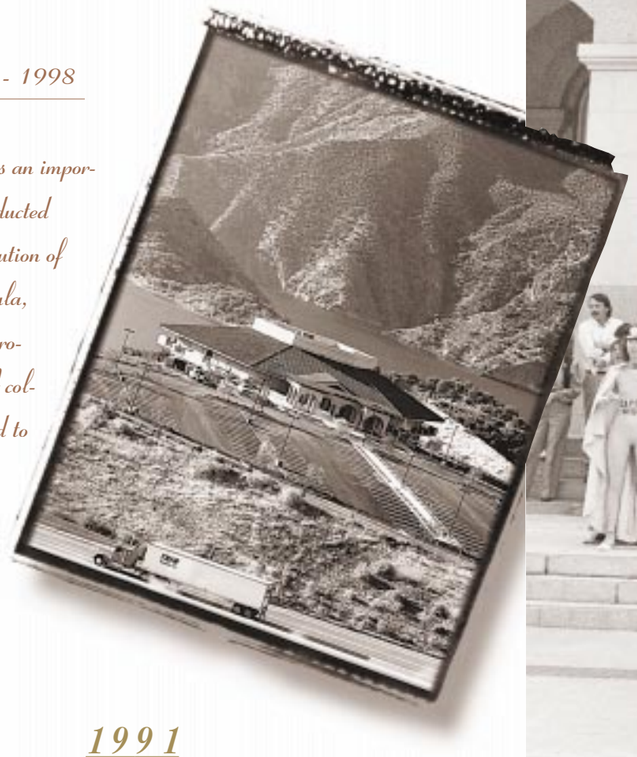
Castle Dam

DWR completes this flood control dam to provide protection to Merced and surrounding areas. The cost of this unit of the Merced County Stream Project is approximately $10 million.

Water Education

Looking Back- The Kennedy Years: 1983 - 1998

Public awareness of important water topics is an important goal for DWR. Public outreach is conducted through a number of venues including distribution of materials (brochures, videos, exhibits, curricula, etc.), visitors facilities, and a water safety program with mascots Albert and Einstein. A collections and archives program was established to preserve items from the Department's past and to use these artifacts to educate the public about the SWP and its significance.



1987

Water Awareness Public Education Program

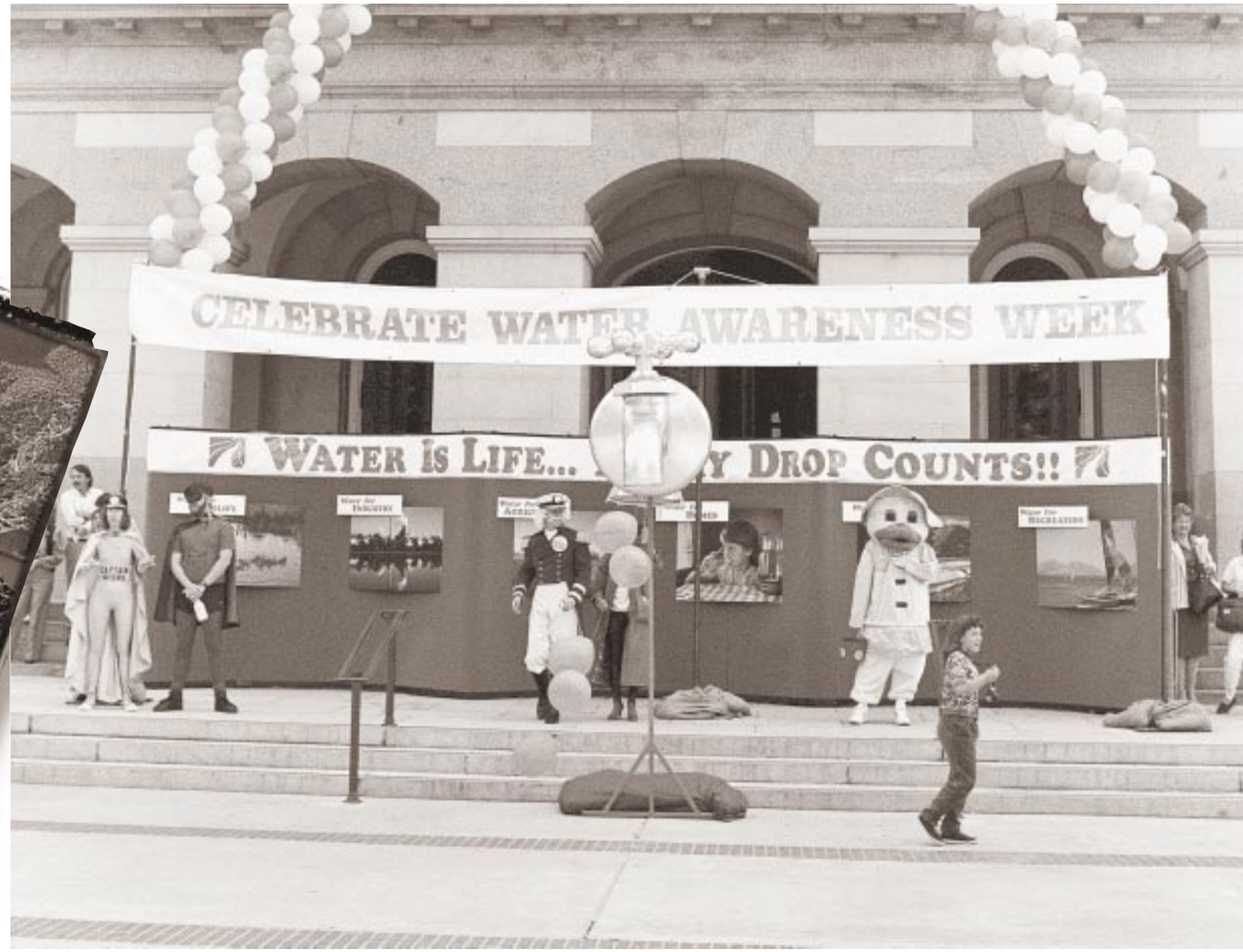
Working with other water agencies, DWR launches a statewide campaign to raise public awareness on the importance of water and water projects. Water Awareness Week later becomes a monthlong celebration for hundreds of local water organizations with their own events, including open houses at water facilities, tours of low-water using gardens, poster contests, water carnivals, shopping mall displays, and seminars.

Today Water Awareness Month is observed by nearly 300 water organizations, contributing over $100,000 to the campaign. For the May event, DWR's field divisions conduct tours, fishing derbies, and other events at their SWP facilities.

1991

S.W.P. Water Safety Public Education Program

After 36 drownings occurred in 1990, DWR initiates a Water Safety Program aimed at educating the public about staying safe while recreating at SWP facilities. In the ensuing years, brochures, a children's activity book (featuring DWR water safety mascots Albert and Einstein), and presentations by DWR staff reach more than 70,000 individuals. The number of drownings drops below the 1990 record.



(clockwise) Vista del Lago Visitors Centers opens. Water awareness is celebrated at the Capitol. Albert and Einstein are appointed DWR's water safety mascots.

1993

Vista del Lago Visitors Center Opening

DWR opens an 18,500-square-foot visitors center on a bluff overlooking Pyramid Lake.

Located 60 miles north of downtown Los Angeles, the center houses exhibits featuring water's importance to California. Exhibits show the amount of water we use daily; the way California's unique geography affects water distribution; the SWP, its magnitude and its function as a water delivery system; the history of water's role in shaping California's past and present; and current water issues and their impacts on the future.

1996

D.W.R. Archives & Collections Program Created

The program will preserve and store artifacts, documents, photos, memorabilia, and other rich heritage.

Photo by Tom Halls, Fresno Bee

A trailer park near the junction of the river and Highway 41 was virtually destroyed.

FLOODPLAIN

Mapping Area

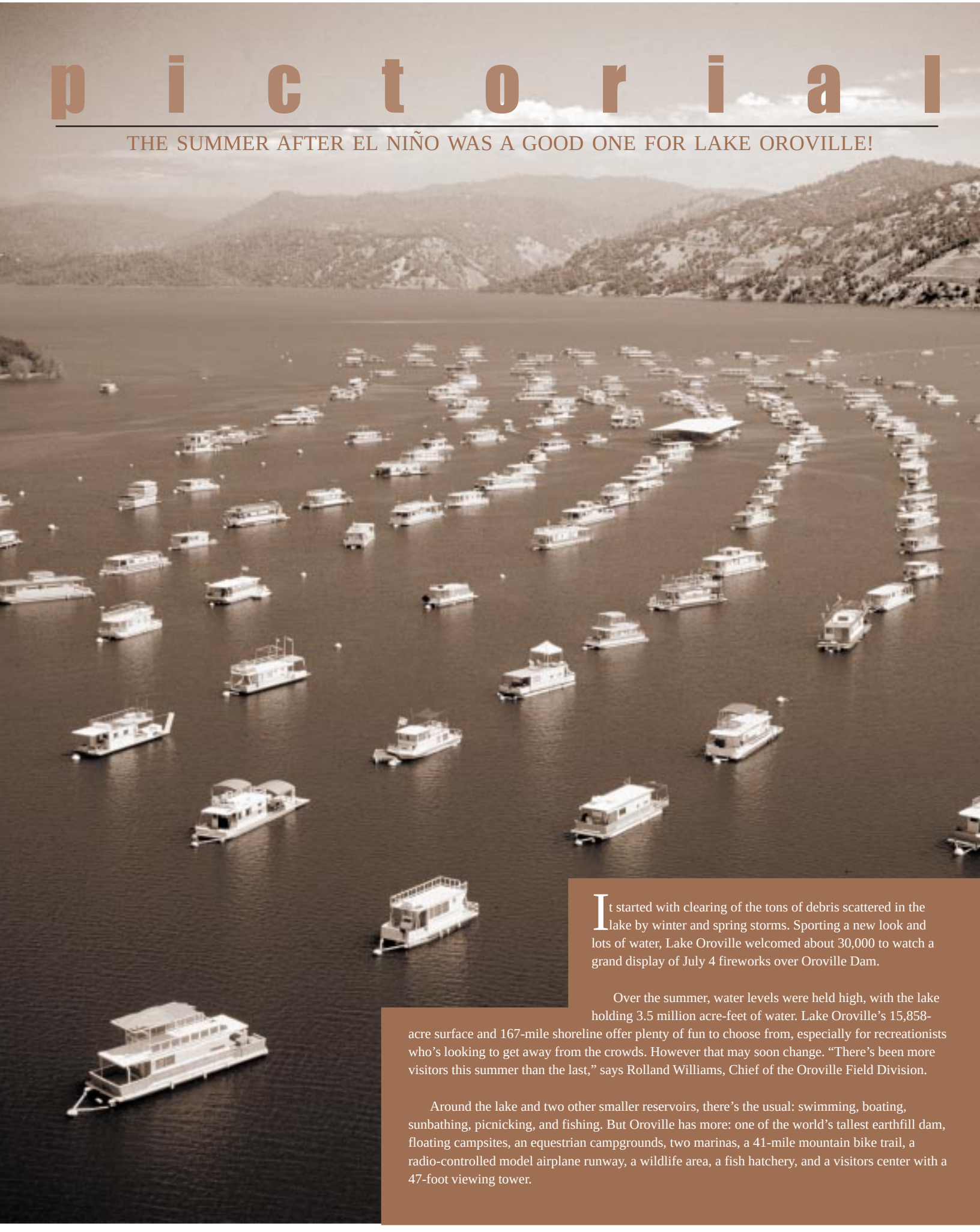
DWR is remapping the floodplain along the San Joaquin River between Friant Dam and Highway 99. This 25-mile reach has one major tributary (Little Dry Creek) and no flood diversion facilities. It runs through a wide and sparsely populated gorge and is fringed by parks and a parkway, several golfing complexes, a pistol range, crop land, exotic fish farms, gravel-mining operations, occasional structures, and a great deal of open land.

Following the January 3, 1997 storm, many of these fringe areas were ravaged by floodflows resulting from sudden and mandatory releases from Friant Dam. A trailer park near the junction of the river and Highway 41 was virtually destroyed. Many acres of riverfront land were eroded by the large and fast-moving flows. In all, property damage totaled many millions of dollars and led to the decision to remap the floodplain to better anticipate and plan for the effects of future flows and continued development.

Another golf course is presently under construction in the riverfront area, and plans are on the drawing board for new homes that would overlook the course.

pictorial

THE SUMMER AFTER EL NIÑO WAS A GOOD ONE FOR LAKE OROVILLE!



It started with clearing of the tons of debris scattered in the lake by winter and spring storms. Sporting a new look and lots of water, Lake Oroville welcomed about 30,000 to watch a grand display of July 4 fireworks over Oroville Dam.

Over the summer, water levels were held high, with the lake holding 3.5 million acre-feet of water. Lake Oroville's 15,858-acre surface and 167-mile shoreline offer plenty of fun to choose from, especially for recreationists who's looking to get away from the crowds. However that may soon change. "There's been more visitors this summer than the last," says Rolland Williams, Chief of the Oroville Field Division.

Around the lake and two other smaller reservoirs, there's the usual: swimming, boating, sunbathing, picnicking, and fishing. But Oroville has more: one of the world's tallest earthfill dam, floating campsites, an equestrian campgrounds, two marinas, a 41-mile mountain bike trail, a radio-controlled model airplane runway, a wildlife area, a fish hatchery, and a visitors center with a 47-foot viewing tower.

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